CLAIMS

1. A light-receiving element for detecting a light intensity and a barycenter thereof for an incident light of a long-wavelength, comprising :

a semiconductor layer of III-V group compound semiconductor ;

a first conductivity-type of resistor layer provided on the top surface of the semiconductor layer ;

a second conductivity-type, opposite to the first conductivity-type, of substrate provided on the bottom surface of the semiconductor layer ; and

at least one pair of opposing electrodes provided on the resistor layer.

2. The light-receiving element of claim 1, wherein the III-V group compound semiconductor is selected from the group consisting of InGaAs, GaAs, AlGaAs, InAs, and InGaAsP.

3. The light-receiving element of claim 2, wherein the III-V group compound semiconductor is InGaAs.

4. The light-receiving element of claim 3, wherein when the first conductivity-type is p-type and the second conductivity-type is n-type, the first conductivity-type of resistor layer is a p-type InP layer, and the second conductivity-type of substrate is a n-type InP substrate.

5. A photodetector for detecting a light intensity and a barycenter thereof for each of lights demultiplexed from an incident light, the incident light including N (N is an

integer equal to or larger than 2) time-divisioned wavelengths, comprising ;

one light-receiving element of any one of claims 1-4,

wherein the one light-receiving element is operated in N time-divisioned timing matched to the impinging timing of respective demultiplexed lights.

6. A photodetector for detecting a light intensity and a barycenter thereof for each of lights demultiplexed from an incident light, the incident light including N (N is an integer equal to or larger than 2) wavelengths, comprising ;

N light-receiving elements of any one of claim 1-4, these light-receiving elements being arrayed in one dimension.

7. A photodetector for detecting a light intensity and a barycenter thereof for each of lights demultiplexed from an incident light, the incident light including N (N is an integer equal to or larger than 2) wavelengths, comprising ;

a first photodetecting means for detecting a barycenter of a light-intensity of each of the demultiplexed lights, the first photodetecting means including N light-receiving elements of any one of claims 1-4 arrayed in one dimension ; and

a second photodetecting means for detecting a light intensity of each of the demultiplexed lights, the second photodetecting means including N light-receiving elements arrayed in one dimension.

8. The photodetector of claim 7, wherein the light-receiving elements of the second photodetecting means are photodiodes.

9. A photodetector for detecting a light intensity and a barycenter thereof for each of lights demultiplexed from an incident light, the incident light consisting of multiplexed bands each including a plurality of wavelengths, comprising ;

a plurality of light-receiving elements of any one of claims 1-4 for every band, the plurality of light-receiving elements being arrayed in one dimension.

10. An optical demultiplexer for demultiplexing an incident light including multiplexed wavelengths, comprising :

an optical means for demultiplexing the incident light into a plurality of lights ; and

a photodetector of claim 5 for receiving the plurality of light demultiplexed by the optical means.

11. An optical demultiplexer for demultiplexing an incident light including multiplexed wavelengths, comprising :

an optical means for demultiplexing the incident light into a plurality of lights ; and

a photodetector of claim 6 for receiving the plurality of light demultiplexed by the optical means.

12. An optical demultiplexer for demultiplexing an incident light including multiplexed wavelengths, comprising :

an optical means for splitting the incident light into two lights ; and

a first optical means for demultiplexing one of the two lights ;

a second optical means for demultiplexing the other of the two lights ;

a photodetector of claim 6 for receiving the lights demultiplexed by the first optical means and for detecting a barycenter of a light intensity for each of the demultiplexed light ; and

a light-receiving element array for receiving the lights demultiplexed by the second optical means and for detecting a light intensity for each of the demultiplexed lights.

13. The optical demultiplexer of claim 12, wherein the light-receiving element array is a photodiode array.

14. An optical demultiplexer for demultiplexing an incident light consisting of multiplexed bands each including a plurality of wavelengths, comprising :

an optical means for demultiplexing the incident light into a plurality of lights for every band ; and

a light-receiving means for receiving the demultiplexed lights for every band, the light-receiving means including a plurality of photodetectors of claim 6.